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| (54) Title: SHORT MESSAGE DEVICE FOR WIRELESS TELEPHONE | | |
| (57) Abstract <p>A short message device for a wireless phone has a receiver to receive different types of messages, a memory (M) and a deletion device. The memory (M) stores the different types of messages and has a limited capacity. The deletion device automatically deletes one type of message when the memory (M) is full, while retaining a second type of message. A display (I) lists the different types of messages together in a single list. A filtering device changes the display (I) from a combined list of the different types of messages to a list of messages of only one type. A text entry device enters text strings when out of a short message area, and a memory (M) stores the text strings. The transmitter can then transmit the stored text strings when in the short message service area. The memory (M) stores the last message unsuccessfully sent from the phone to a wireless provider. A recall device recalls the last message unsuccessfully sent and attempts to resend the message.</p> <div style="text-align: right;"> </div> | | |

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SHORT MESSAGE DEVICE FOR WIRELESS TELEPHONE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates in general to a short message device for wireless
5 telephones, and more specifically to a device having advanced display, receive and send capabilities.

2. Description of the Related Art

With the advanced communication capabilities of wireless phones, it has been
proposed to use these phones to send and receive short messages. This is known as a short
10 message service (SMS).

The proposed use of SMS has presented a number of new problems. For example, mobile phones have a limited capacity memory, and how messages will be received as the memory approaches its maximum capacity presents a problem. A full memory presents particular problems for receiving broadcast messages which are sent to mobile subscribers in
15 a given serving area. Broadcast messages are normally sent only once, and if there is not a memory slot for the broadcast message at that time, it cannot be received. Similarly, a full memory presents problems for a subscriber that receives point-to-point messages because new messages cannot be delivered to his/her handset until one or more existing messages has been deleted.

Another problem relates to the fact that a wireless phone is not always within a serving area having an SMS capability. Thus, there are times when a user cannot send a message. When a message cannot be sent, it may be because SMS service is not available at that location. In this case, some sort of further action by the user would be necessary to send the message. Furthermore, even when the user can send a message, it is sometimes not convenient to compose the message while within an SMS area, and this is due to the mobile environment and the limitations of a telephone keypad.

Wireless phones traditionally have limited screen space to view a list of the users messages. To alleviate this problem, it has been proposed to save messages in separate folders. However, if there are relatively few messages, switching to different folders adds unnecessary complexity in manipulating the telephone handset.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a short message device which can easily receive additional short messages, perhaps including broadcast messages, despite a limited memory capacity.

It is a further object of the present invention to provide a short message device which can easily send messages despite a limited SMS service area, such that messages can be easily composed with transmission failures being less of a problem.

It is yet another object of the present invention to provide a short message device which allows the user to easily view a listing of received messages.

These and other objects are accomplished by providing a short message device for a wireless telephone, having a receiver to receive different types of messages, a memory and a
5 deletion device. The memory stores the different types of messages and has a limited capacity. The a deletion device automatically deletes one type of messages when the memory is full, while retaining a second type of messages.

A display lists the different types of messages together in a single list. A filtering device changes the display from a combined list of the different types of messages to a list of
10 messages of only one type.

A text entry device enters text strings when out of a short message area, and a memory stores the text strings. The transmitter can then transmit the stored text strings when in the short message service area.

Phone numbers and names associated therewith may be stored in a directory. If a
15 phone number of a message recipient entered in a number entry device is stored in the directory, the name of the recipient is displayed by the display.

The memory stores the last message unsuccessfully sent from the phone to a wireless provider. A recall device recalls the last message unsuccessfully sent and attempts to resend the message.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be readily understood by reference to the following description of specific embodiments described by way of example only, with reference to the accompanying drawings, wherein:

5 FIGs. 1A through 1S are screens of a wireless telephone according to the present invention, for describing general features and memory allocation of the telephone;

 FIG. 2 is a top view of the wireless telephone according to the present invention;

 FIGs. 3A through 3D are screens appearing in the display of the telephone, for describing viewing and responding to received messages;

10 FIGs. 4A through 4L are screens appearing in the display of the telephone, for describing sending point-to-point message;

 FIGs. 5A through 5G are screens appearing in the display of the telephone, for describing a prepared message feature;

15 FIGs. 6A through 6F are screens appearing in the display of the telephone, for describing resending a last unsent message; and

 FIG. 7 shows the hardware of a wireless telephone according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The wireless telephone according to a preferred embodiment of the present invention may receive voice mail messages, cellular broadcast messages, and point-to-point text

messages (including E-mail). It may also be used to send point-to-point text messages including E-mail. A description of the categories of messages follows.

For voice messages, unanswered calls are usually routed to a voice mailbox where the caller can leave a brief voice message. The user can access these messages through the
5 phone.

Cellular broadcast messages (referred to as "broadcast messages" hereafter) are sent to subscribing units (wireless phones) within a specific geographical area. A broadcast message may relate to a current news event such as a weather problem or a traffic problem. The phone must be turned ON to receive broadcast messages. Messages that are broadcast
10 during periods when the phone is turned OFF cannot be subsequently retrieved and read.

The phone can be used to compose, send, and receive point-to-point text messages (also referred to as "point-to-point messages"). Messages may be sent to or received from any subscriber on the service provider's network (and possibly other networks).

Saved messages are point-to-point text messages and broadcast messages that the user
15 has received and elected to save for future reference. As will be described below, they are not automatically overwritten by new incoming messages.

Prepared messages are text messages that have been composed and saved for sending at some future time. This includes "canned" messages (such as "Don't forget the meeting tomorrow at 9 AM" and "Will be home at ...") that are repeatedly used.

Any point-to-point text message that the user has successfully sent is considered to be a "sent" message. This includes replies and forwarded messages.

An unsent message is a point-to-point text message that the user attempted to send but could not send because he/she was outside the SMS message service area or encountered other technical difficulties.

Any point-to-point text message or broadcast message that has been received but NOT displayed is considered to be an unread message. Broadcast messages that have been automatically displayed but not acknowledged are also considered to be "unread".

Protected messages consist of unread point-to-point text messages and all saved messages. These message are "protected" in the sense that they are not automatically deleted to make memory space available for new incoming messages under any circumstances.

A voice mail message "waiting to be reviewed" is one that has not been heard by the user. It may be a new voice message that has arrived since the voice mail feature was last used OR any previously received voice message that the user has not heard. An "unread" point-to-point text message is one that has not been displayed on the LCD. An "unread" broadcast message is one that has been received but not yet displayed on the LCD or one that has been automatically displayed upon receipt but not responded to during a predetermined period of time.

FIGs. 1A through 1S are screens of a wireless telephone according to the present invention, for describing general features and memory allocation of the telephone. FIG. 2 is

a top view of the wireless telephone according to the present invention. According to one possible embodiment, twenty-five memory locations are allocated for SMS messages. Table 1A summarizes the allocation scheme. Table 1B shows the specific allocation.

TABLE 1A

| Message Type | Dedicated Memory Locations | Shared Memory Locations |
|------------------------------|----------------------------------|-------------------------------|
| Broadcast Messages (B) | 3 | 0 |
| Point-toPoint Messages (PtP) | 0 | 15 |
| Saved Messages (S) | 5 | 15 |
| Prepared Messages (P) | 5 | 0 |
| Last Sent Message (LS) | 1 | 0 |
| Last Unsent Message (LU) | 1 | 0 |

TABLE 1B

| Memory Location | Type of Message |
|-----------------|-----------------|
| 1 | B |
| 2 | B |
| 3 | B |
| 4 | PtP or S |
| 5 | PtP or S |
| 6 | PtP or S |
| 7 | PtP or S |
| 8 | PtP or S |
| 9 | PtP or S |
| 10 | PtP or S |
| 11 | PtP or S |
| 12 | PtP or S |
| 13 | PtP or S |
| 14 | PtP or S |
| 15 | PtP or S |
| 16 | PtP or S |
| 17 | PtP or S |
| 18 | PtP or S |
| 19 | P |
| 20 | P |
| 21 | P |
| 22 | P |
| 23 | P |
| 24 | LS |
| 25 | LU |

Broadcast messages (B) have three dedicated memory locations. A new incoming message is placed in any one of the three dedicated locations. When all three locations are "full", the "oldest" broadcast message is automatically deleted when a new message arrives. This insures that an incoming broadcast message will never be "lost" because of an out-of-memory condition and that the user will always have access to the last three broadcast messages received at the handset (unless manually deleted).

The user can create up to five prepared (P) messages. Each is stored in a dedicated memory location. Prepared messages can be deleted but cannot be overwritten. An error message (see the screen of FIG. 1A) is displayed if the user attempts to create a sixth prepared message without deleting one of the five existing prepared messages.

Each sent message is automatically saved in a dedicated memory location at the time it is sent. It remains there as a last sent message (LS) until replaced by the next sent message.

If an attempt to send a message fails, the message is considered to be unsent. The last unsent (LU) message may be saved in a dedicated memory location until sent at a later time or replaced by a more recent unsent message.

According to this one embodiment, a block of fifteen shared memory location is allocated for point-to-point text messages (PtP) and saved messages (S). Each location can be filled with any one of the following:

* An unread point-to-point text message (i.e., one that has never been displayed)

- * A point-to-point text message that has been read but not saved
- * A point-to-point text message that has been read and saved
- * A broadcast message that has been read and saved

Point-to-point text messages that have been read but not saved are not protected.

- 5 They are automatically deleted as necessary to make space available for new incoming point-to-point text messages and new saved messages. In each case the "oldest" unprotected message (first message received) is the one that is deleted.

Unread point-to-point text messages and saved messages are protected. If all 15 shared memory locations are filled with either an unread point-to-point text message or a saved message, additional messages cannot be saved and new point-to-point text messages cannot be delivered. When a delivery is attempted, the screen of FIG. 1B is displayed. When NEXT is selected from the taskbar (left arrow key - see FIG. 2), the screen of FIG. 1C appears.

- 15 In order to prevent this problem from occurring, the user is warned (see the screen of FIG. 1D) whenever only limited memory locations are available to receive incoming point-to-point text messages. For example, FIG. 1D may be used when only 20% of the memory (3 memory locations or fewer) remains. The warning appears again each time one of the available memory locations is filled with a protected message (i.e., a new unread point-to-point text message or saved message).

Selecting OK at either the screen FIG. 1C or FIG 1D displays the list of protected messages (the screens of FIGs. 1E and 1F). The user can make additional shared memory locations available by reading (but not saving) any unread point-to-point text messages and/or by deleting one or more saved messages.

5 Selecting IGNORE at FIG. 1D with the right arrow key advances the dialog to the next screen, the screen that would have been displayed if the dialog had not been interrupted by the warning. If the user fails to heed the warnings described above and attempts to save a broadcast message or point-to-point text message when the memory is full, the screen of FIG. 1G is displayed. OK returns the dialog to the previous screen where the SAVE was
10 attempted.

Several methods may be used to obtain access to messages. They vary somewhat by type of message and priority.

To obtain access to voice mail, the user may press a messages key M in FIG. 2. If the message key is held down briefly and released, the first screen of the SMS main menu
15 (FIG. 1H) appears. The user selects "1. Voice mail", and a call to the voice mail access number is automatically placed. He/she then follows the voice mail prompts for access to the messages. If the messages key is held down for a predetermined period of time (perhaps 2.5 seconds or more), a call to voice mail is automatically placed. The screen of FIG. 1H (the first page of the SMS main menu) appears during the 2.5 seconds interval before the
20 voice mail access number is dialed.

The user may obtain access to broadcast messages in several ways. In some instances, the messages are automatically displayed. In others, one or more key presses is required.

5 New broadcast messages (except messages with urgent or emergency priority) are automatically displayed when received if no activity is in progress (i.e., HOME screen of FIG. 2 is being displayed). The broadcast message appears for a period of time, perhaps 15 seconds, and then is replaced with the HOME screen unless the user presses one of the soft arrow keys or hard keys that is currently active. In this case, the 15 second time-out feature is disabled, and the broadcast message continues to be displayed until removed by user
10 action.

The screen of FIG. 1I is an example of a new incoming broadcast message as it appears if displayed automatically.

If an activity (e.g., call, text entry, message review, etc.) is in progress when a new broadcast message (normal priority) arrives, an audible is message alert provided, but the
15 message is not displayed. However, the message can be subsequently accessed.

New broadcast messages with either an urgent or emergency priority are not automatically displayed. If no activity is in progress when an urgent or emergency broadcast message arrives (i.e., the HOME screen is being displayed), a screen similar to the screen of FIG. 1J appears showing the priority (URGENT or EMERGENCY), time, and source of the
20 broadcast message.

The user can view the last three broadcast messages that have been delivered (plus any saved broadcast messages) by pressing the messages key M and selecting "2. Text ..." from the SMS main menu (the screens of FIGs. 1H, 1K and 1L). This action displays the list of all SMS text messages (see FIGs. 1M-1P). Specific broadcast messages may then be selected for viewing. The listing for each broadcast message is preceded by "o", a graphical representation of the broadcast icon.

In contrast to broadcast messages, the display of point-to-point text messages is not automatic. The user must press at least one key. The arrival of each new point-to-point text message is signaled by both audible and visual (flashing envelope icon I - see FIG. 2) alerts.

When there are unread point-to-point text messages waiting to be reviewed, the envelope icon I along with a "T" symbol are continuously displayed. The user may obtain access to these unread messages by pressing the messages key M and the selecting "2. Text ..." from the SMS main menu (SMS screens of FIGs. 1H, 1K and 1L). Individual point-to-point text messages may then be reviewed by making selections from the list of text messages (SMS screens of FIGs. 1M-1P).

Saved broadcast messages and saved point-to-point text messages may be accessed by selecting "4. Saved text msgs" from the SMS main menu (SMS screens of FIGs. 1H, 1K and 1L). This action displays a list showing all saved text messages (SMS screens of FIGs. 1Q and 1R). If there are no saved text messages, the SMS screen of FIG. 1S is displayed.

Alternatively, the user may select "2. Text ..." from the SMS main menu, and a list

showing all broadcast messages and point-to-point text messages is displayed. In FIGs. 1M-1R, an "S" in the last column indicates that a given message is a saved message. An "R" in FIGs. 1M-1P indicates that a given message has been read but not saved. Messages that have been read but not saved are not protected and may be automatically deleted to make room for new messages.

Access to the last unsent message may only be obtained by selecting "8. Last UNSENT msg" from the SMS main menu (see SMS screen of FIG. 1L).

Protected messages (unread point-to-point text messages and saved messages) are not automatically deleted upon receiving a new message. The list of protected messages (FIG. 1E and 1F) can only be displayed by selecting OK at the SMS screen of FIG. 1C or 1D. These screens appear only under circumstances where the user should or must read and/or delete protected messages to free memory for new messages. One memory location becomes available each time an "unread" point-to-point text message is read but not saved. Similarly, deleting a saved message frees one memory location.

Individual text messages (broadcast messages and point-to-point text messages) may be displayed using any of several methods including entering the number to the left of the listing while viewing the SMS screens of FIGS. 1M-1P.

Viewing and responding to text messages will now be described. The text message list (SMS screen of FIGs. 1M-1P) may be displayed by selecting "2. Text (T=N/o=n)" from the SMS main menu (SMS screens of FIGs. 1H, 1K and 1L). "T" corresponds to the T

(text) symbol in Fig. 2, "o" is a graphical representation of the broadcast message icon, N in "T=N" is the number of new (unread) point-to-point text messages, and n is the number of new (unread) broadcast messages. Hence, "(T=4/o=3)" indicates that the user has 4 new point-to-point text messages and 3 new broadcast messages. If there are no new messages of a specific type, that symbol is omitted. For example, if there were only 1 new point-to-point text message and no new broadcast messages, the symbology following "2. Text" would be "(T=1)". Note that with the memory allocation described above, n cannot exceed 3, and N cannot exceed 15.

Viewing and responding to received messages will now be described with specific reference to FIGS. 3A through 3D. If there are no messages (either new or old) in the text message list, the SMS screen of FIG. 3A is displayed when the list is accessed.

It should be noted that in some situations all four lines of the display may be used to show text content of messages (see the screens of FIGs. 3B and 3C). When this occurs, the first set of taskbar labels (e.g., NEXT MSG | U/D | BACK in FIGs. 3B and 3C) are not displayed. In order to make the taskbar labels appear, the user must do one of the following: page down to the end of the message, press the left or right arrow keys (S1 or S2), or press the Options key O. Any of these actions causes the fourth line of the text to be overwritten with the taskbar labels.

Within the text message list of FIGs. 1M-1P, messages are listed in reverse chronological order. The most recent message is at the top of the list (position #1) and the

oldest message is at the bottom. With the proposed memory allocation, the maximum number of messages in the list is 18.

The listing for each broadcast message (i.e., Weather, Traffic, Sports, and CNN News in this example) is preceded by "o", a graphical representation for the broadcast icon.

5 Point-to-point messages are listed in three ways. First, a 10-digit phone number may be listed. This is usually the sender's phone number. Second, the name of the person sending the message may be listed. This occurs only when the sender's name is listed in the user's directory of phone numbers. Third, the first 12 characters in the message followed by "... " may be listed. This occurs only when the origin of the message is uncertain (e.g.,
10 message sent from a computer or E-mail).

The text message list has a filtering feature. To activate the filtering feature, an options key O (see FIG. 2) is depressed. This causes the "UNREAD | U\N | HOME" line to be displayed in FIGS. 1M to 1P. The actual phone display may be a four line display. Although several of the screens show more than four lines, all lines after the fourth line are
15 used to replace the fourth line with the option O key. That is, the option O key changes the function of the soft keys (arrow keys).

Once the line with UNREAD is displayed in the taskbar (fourth line of the display), UNREAD can be selected by pressing S1 (left arrow in FIG. 2). Selecting UNREAD (left arrow key - S1) displays the list of unread messages (messages 1, 2, 8, and 9). At the same
20 time the taskbar (fourth line) label changes from UNREAD to SAVED in the left hand

portion. Selecting SAVED (S1) displays the list of SAVED messages (SMS screens of FIGS. 1Q and 1R). At the same time the taskbar label changes from SAVED to ALL in the left hand portion. Selecting ALL (S1) redisplay the original list with all text messages (SMS screens of FIGs. 1M-1P). At the same time the left portion of the taskbar label changes from ALL back to UNREAD, and the unread messages can be displayed. Reverse chronological order (as described earlier) is also maintained in the unread and saved lists.

Selecting OK at either SMS screen of FIGs. 1C or 1D displays the list of protected text messages (SMS screens of FIGs. 1E and 1F). As described earlier, this is a filtered list containing only unread point-to-point text messages and saved messages. This list simplifies the process of making memory available for new messages because only those messages that if read or deleted would make memory space available are shown in the list. Hence, from this list the user cannot read or delete messages that will not free memory. This saves considerable time and reduces user frustration.

The SMS screen of FIG. 3B shows a broadcast message (including taskbar options) as it would appear if accessed from the text message list (SMS screens of FIGs. 1M-1P) unless previously saved. In this case, the SAVE option at the seventh line is not available. The first line is the header or time stamp. It shows the time and date. The ellipses ("...") indicate that the message continues beyond the fourth line. NEXT MSG displays the next message in the text message list (i.e., message #2 if message #1 is being displayed). When the last message in the list is displayed, NEXT MSG is not shown in the taskbar because that

function is not available. U and D may be used to "page" through the message if it is longer than three lines (see Fig. 3B) changing all three lines of the text display. U is not shown when the first page is displayed because that function is not available. Likewise, D is not shown when the last page is displayed. PREV MSG displays the previous message in the text message list. When the first message in the list is displayed, PREV MSG is not shown in the taskbar because that function is not available. DELETE initiates the process for deleting the displayed broadcast message.

When a message is deleted, all appropriate lists are updated. All listings for that message are removed, and listings "below" (i.e., listings with higher numbers) are automatically moved up one place in each of the lists (e.g., from position 6 to position 5).

SAVE initiates the process for saving the displayed message. Once the message has been saved, all appropriate lists are updated. The message is added to the list of saved messages and the list of protected messages in the proper places so that reverse chronological ordering is preserved within the lists. "S" appears after its listing in each of the message lists. The SAVE choice no longer appears in the taskbar when the message is displayed.

HOME returns to the home screen of FIG. 2.

As mentioned above, the SMS screen of Fig. 1I shows a new broadcast message as it would appear if not accessed from a list. Notice that NEXT MSG and PREV MSG are not shown in the taskbar because they have no meaning in this context.

The SMS screen of FIGs. 3C shows a point-to-point text message and its taskbar options as they would appear if accessed from the text message list (SMS screen of FIGs. 1M-1P) unless previously saved, in which case SAVE would not be available. The first line of each message provides information about the sender (usually a phone number), if available. The second line is the header showing the time and date. Ellipses ("..."), if present, indicate that the message continues beyond the fourth line. NEXT MSG, U/D, PREV MSG, HOME, DELETE and SAVE initiate substantially the same actions as they do when the user is viewing a broadcast message. Again note that the fifth, sixth and seventh lines would normally not be seen, but are moved to the visible fourth line to activate the corresponding line functions using the option key O of FIG. 2.

CALL BACK # displays the messages call back number as specified by the sender (See the SMS screen of FIG. 3D). The user can place a call to this number by selecting CALL or CALL LD from the taskbar. CALL LD inserts a "1" into the phone number for long distance calls.

REPLY initiates the process for sending a direct reply (point-to-point text message from the recipient of the message to the sender). FWD initiates the process for forwarding the message to another person.

Sending point-to-point messages will now be described with specific reference to FIGS. 4A through 4L. A variety of features enable users to compose and send point-to-point text messages from the short message device of the present invention. The SMS screens of

FIGs. 4A and 4B are used to compose and send most messages. To compose and send a new message, the user selects "3. Compose & Send" from the SMS main menu (SMS screens of FIGs. 1H, 1K and 1L). The SMS screen of FIG. 4A is displayed. The intended recipient's phone number is entered at the SMS screen of FIG. 4A. A point-to-point text message is addressed by entering a phone number or other valid number at the SMS screen of FIG. 4A using the numeric keypad on the handset. Pressing "*" enters a blank space; pressing "#" enters a hyphen. Parentheses and other symbols may be entered using the SYMB (symbol) feature. If the phone number for a message's intended recipient is recorded in one of the phone's directory's, the user may use the GET # feature (S1, left soft key) to retrieve that number and enter it at the SMS screen of FIG. 4A.

Once a valid number has been entered at FIG. 4A, NEXT may be used to advance the dialog to the next screen (FIG. 4B) where the message is composed.

To compose and send a direct reply, the user selects REPLY from the taskbar of any displayed point-to-point text message with this taskbar choice (e.g., SMS screens of FIG. 3C). This action displays the SMS screen of FIG. 4C. The user can compose and send a reply from this screen. Note that the recipient's phone number has already been entered in the "TO:" field. This number is the same one that appeared in the "FROM:" field of the original message (FIG. 3C).

To forward a message, the user selects FWD from the taskbar of any displayed point-to-point text message with this taskbar choice (e.g., SMS screen of FIG. 3C). This action

displays the SMS screen of FIG. 4A. The intended recipient's phone number is entered here. NEXT advances the dialog to the SMS screen of FIG. 4D where an optional message to accompany the forwarded message may be composed.

Messages that could not be sent initially due to technical problems (e.g., phone
5 outside an SMS service area) can be sent at a later time using the last UNSENT message feature, item 8 in the SMS screen of FIG. 1L. This displays the SMS screen of FIG. 4E.

Messages may be created at the SMS screen of FIG. 4B by text entry or by using the GET MSG feature to copy a message that has been previously saved. In either case, editing functions are always available to correct errors and make changes. GET MSG may be used
10 to copy a saved message to the text input area (i.e., message field) of the SMS screen of FIG. 4B. This eliminates the need to retype messages or parts of messages that will be sent more than once. Three types of messages may be copied: prepared messages, saved point-to-point text messages (but not saved broadcast messages), and the last SENT point-to-point text message.

15 Selecting GET MSG at the SMS screen of FIG. 4B displays the SMS screen of FIG. 4F, the menu for GET MSG. Choosing "1. Prepared msgs" from this menu shows the list of prepared messages (SMS screens of FIGs. 4G and 4H). Choosing "2. Saved text msgs" shows the list of saved point-to-point text messages (SMS screen of FIG. 4I). Individual messages may be displayed by making selections from these lists. The SMS screen of FIG.
20 4J is an example of a prepared message as it would appear when retrieved using GET MSG.

The SMS screen of FIG. 4K is an example of a saved point-to-point text message as it would appear when retrieved using GET MSG.

Selecting COPY MSG at the screen of FIG. 4J, 4K or 4L copies the displayed message to the SMS screen of FIG. 4B, 4C or 4D. However, any sender information or time stamp data (such as shown in the SMS screen of FIG. 4K) are not copied. The SMS screen of FIG. 4B, 4C or 4D is displayed with the copied message in the text input area (message field).

Choosing "3. Last SENT msg" from the menu for GET MSG (the SMS screen of FIG. 4F) displays the last message sent from the handset (see the SMS screen of FIG. 4L).

The last sent message feature is very useful because it lets the user send the same message to several recipients without having to retype the message. The user simply enters the phone number for the next recipient at the SMS screen of FIG. 4A, presses NEXT, and retrieves the last sent message at the SMS screen of FIG. 4B using GET MSG.

If the user attempts to access a message using GET MSG and there are no messages of that type, the user is notified. For example, the "2. Saved text messages" is selected at the SMS screen of FIG. 4F, the SMS screen of FIG. 1S might appear.

CANCEL may be used from FIGs. 4B to 4D to terminate the Compose & Send task at any time. The dialog returns to the previous screen. From FIG. 4B dialog returns to the first page of the SMS main menu (the SMS screen of FIG. 1H). From FIG. 4C or 4D, dialog returns to the original message (FIG. 3C).

Once a message had been addressed and composed, it may be sent. The user initiates the process by selecting SEND MSG from the taskbar of the SMS screen of FIG. 4B.

Similarly SEND (FIG. 4C) and SEND FWD (FIG. 4D) will send a message.

5 Sending a reply is very similar to composing and sending a new message. A direct reply can be sent from any message screen with REPLY as one of the taskbar choices. See, for example the SMS screen of FIG. 3C. This action displays the SMS screen of FIG. 4C. The user can compose and send a reply from this screen. Note that the recipient's phone number or other ID number is automatically entered in the "TO:" field.

10 The prepared message feature will now be described in detail with specific reference to FIGs. 5A-5G. Prepared message are messages that have been composed and saved for sending at some future time. This includes "canned" messages (such as "Don't forget the meeting tomorrow at 9 AM" and "Will be home at ...") that are repeatedly reused. According to the proposed memory allocation scheme, the maximum number of prepared messages is five.

15 To work with prepared messages, the user selects "7. Prepared msgs" from the SMS main menu (the SMS screens of FIGs. 1H, 1K and 1L). If there are no prepared messages when the user selects "7. Prepared msgs" from the SMS main menu, the SMS screen of FIG. 5A is displayed. BACK returns the dialog to the SMS screen of FIG. 1H, the first page of the SMS main menu. To compose the first prepared message, the user could select ADD at
20 the SMS screen of FIG. 5A. The SMS screen of FIG. 5B would then be displayed.

SPACE, A -> a, a -> A, CLEAR, SYMB, l, u/d, r, U/D, and HOME have editing functions or functions described previously. CLR MSG removes all entries that have been made in the input field. This is equivalent to using CLEAR several times to remove all characters that have been entered. SAVE saves the message and places it in the list of prepared messages. The dialog goes to the first page in the list of prepared messages (the SMS screen of FIG. 5C) and shows the new message in position "1.", since it is the first prepared message to be entered. Each subsequent prepared message is added to the bottom of the list.

If there is at least one prepared message when the user selects "7. Prepared msgs" from the SMS main menu (the SMS screens of FIG. 1H, 1K and 1L), the first page of the list of prepared messages (SMS screens of FIG. 5C) is displayed. The second page of the list is the SMS screen of FIG. 5D.

Individual messages (e.g., the SMS screen of FIG. 5E) may be displayed by making selections from the list of prepared messages. Selecting ADD at FIG. 5C or 5D displays the SMS screen of FIG. 5B which may be used to add additional prepared messages. However, if there are already five prepared messages (the maximum number allocated), the SMS screen of FIG. 5F (which instructs the user to remove a message) is displayed. MOVE activates a MOVE feature which may be used to rearrange the order of the items in the list. BACK returns the dialog to the SMS of FIG. 1H, the first page of the SMS main menu.

The SMS screen of FIG. 5E is a sample prepared message. This is a "canned" message that can be completed before it is sent by using an editing feature. This may be done by selecting EDIT. After all additions and changes have been made, the SMS screen of FIG. 5G is displayed. YES returns the dialog to the SMS screen of FIG. 5E and shows the changes that have been made. NO returns the dialog to the same screen, but any changes that were made are not shown.

To delete a prepared message, the user selects DELETE while viewing the SMS screen of FIG. 5E.

Resending the last unsent message will now be described with reference to FIGs. 6A to 6F. If the user attempts to send a message when outside the area where SMS messaging service is provided, the SMS screen of FIG. 6A is displayed. Selecting YES saves the message in the dedicated memory location (see Table 1B) for last unsent message so that it can be sent at a later time. Selecting NO causes the message to be deleted, and it cannot be recovered at a later time. The exit path for NO is the SMS screen of FIG. 1H (the first page of the SMS main menu). If YES is selected, the SMS screens of FIGs. 6B and 6C are displayed. This is a single message that occupies two pages. The continuation to page two is signaled by "...".

When the user returns to a geographical area where SMS point-to-point text messages may be sent and received, he/she may again attempt to send the last unsent message if it was saved at the SMS screen of FIG. 6A. To do this, the user selects "8. Last UNSENT msg"

from the SMS main menu (the SMS screens of FIGs. 1H, 1K and 1L). The SMS screen of FIG. 6D is displayed.

The message may now be sent by selecting SEND MSG. As with most other features, a confirming screen (the SMS screen of FIG. 6E) is displayed. The user selects OK to confirm, and the message is sent. Once the message has been sent, it is moved from the dedicated memory location for last UNSENT message to the dedicated memory location for last SENT message. The memory location for last UNSENT message is now empty. If the user selects "8. Last UNSENT msg" from the SMS main menu, the SMS screen of FIG. 6F is displayed. OK returns the dialog to the first page of the SMS main menu (the SMS screen of FIG. 1H).

FIG. 7 shows the hardware of a wireless telephone according to the present invention. As can be seen, the phone has a processor (CPU) connected to a user interface, a memory and a transceiver. The transceiver is in turn connected to an antenna.

While the invention has been described in connection with the preferred embodiments, it will be understood that modifications within the principles outlined above will be evident to those skilled in the art. Thus, the invention is not limited to the preferred embodiments, but is intended to encompass such modifications.

WHAT IS CLAIMED IS:

- 1 1. A short message device for a wireless phone, comprising:
2 a receiver to receive different types of messages;
3 a memory to store the different types of messages, the memory having a
4 limited capacity;
5 a deletion device to automatically delete one type of messages when the
6 memory is full, while retaining a second type of messages.

- 1 2. A short message device according to claim 1, wherein broadcast messages are
2 stored in first dedicated memory locations and at least one of point-to-point messages and
3 saved message are stored in second dedicated memory locations.

- 1 3. A short message device according to claim 2, wherein an oldest broadcast
2 messages is deleted upon receiving a new broadcast message, when the first dedicated
3 memory locations are full.

- 1 4. A short message device according to claim 1, wherein the short message
2 device informs the user when the memory is almost full or full of the second type of
3 messages and requests the user to delete message of the second category.

1 5. A short message device according to claim 4, wherein a listing of only the
2 second type of messages is displayed when the memory is almost full.

1 6. A short message device for a wireless phone, comprising:
2 a receiver to receive different types of messages;
3 a display to list the different types of messages together in a single list;
4 a filtering device to change the display from a combined list of the different
5 types of messages to a list of messages of only one type.

1 7. A short message device according to claim 6, wherein the filtering device
2 toggles between unread messages, saved messages and all messages.

1 8. A short message device according to claim 6, wherein the different types of
2 messages are displayed together in a chronological order or reverse chronological order.

1 9. A short message device according to claim 6, further comprising a directory to
2 store phone numbers and names associated therewith, a name being displayed by the display
3 when the phone number of a sender of the message is stored in the directory.

1 10. A short message device according to claim 6, wherein the display includes
2 icons next to the listing of each message to identify the type of message.

1 11. A short message device according to claim 10, wherein the icons include an
2 icon to identify the message as a broadcast message, an icon to identify the message as a
3 saved message and an icon to identify the message as a read but not saved message.

1 12. A short message device for a wireless phone, comprising:
2 a text entry device to enter text strings when out of a short message area;
3 a memory to store text strings; and
4 a transmitter to transmit the stored text strings when in the short message
5 service area.

1 13. A short message device according to claim 12, wherein the text entry device
2 also accepts text strings when in the short message service area.

1 14. A short message device according to claim 12, wherein the text entry device
2 accepts text strings during a call.

1 15. A short message device according to claim 12, further comprising:

2 a directory to store phone numbers and names associated therewith;
3 a display; and
4 a number entry device to enter the phone number of a message recipient, a
5 name of the recipient being displayed by the display when the phone number of the message
6 recipient is stored in the directory.

1 16. A short message device according to claim 12, wherein the recall apparatus
2 recalls text strings into messages to be transmitted and recalls text strings during a call.

1 17. A short message device according to claim 12, wherein the text strings are
2 selected from saved point-to-point text messages, prepared messages and a last sent point-to-
3 point text message.

1 18. A short message device according to claim 12, wherein the text entry device
2 allows a user to revise the text strings after being recalled into the message to be transmitted.

1 19. A short message device for a wireless phone, comprising:
2 a transmitter to transmit a message from the phone to a wireless provider;
3 a memory to store the last message unsuccessfully sent from the phone to the
4 wireless provider; and

5 a recall device to recall the last message unsuccessfully sent and attempt to
6 resend the message.

1 20. A short message device according to claim 19, wherein the last message
2 unsuccessfully sent is deleted from the memory after it has been successfully sent.

1 21. A short message device according to claim 19, wherein after a message has
2 been unsuccessfully sent, the user is requested to confirm that the message should be saved
3 in the memory.

AMENDED CLAIMS

[received by the International Bureau on 13 July 1999 (13.07.99);
original claims 1-4 amended; remaining claims unchanged (1 page)]

1. A short message device for a wireless phone, comprising:
 - a receiver to receive different types of messages;
 - a memory to store the different types of messages, the memory having a limited capacity and dynamically allocated memory locations such that the memory will always be capable of storing at least a predetermined number of messages of the first and second types;
 - a deletion device to automatically delete one type of messages when the memory is full, while retaining a second type of messages.
2. A short message device according to claim 1, wherein broadcast messages are stored in first dedicated memory locations and at least one of point-to-point messages and saved messages are stored in second dedicated memory locations.
3. A short message device according to claim 2, wherein an oldest broadcast message is deleted upon receiving a new broadcast message, when the first dedicated memory locations are full.
4. A short message device according to claim 1, wherein the short message device informs the user when the memory is almost full or full of the second type of messages and requests the user to delete a message of the second type.

FIG. 1A

| |
|---|
| You must delete one prepared msg before adding another. |
| OKI |

FIG. 1B

| |
|---|
| Memory full. Incoming message can't be delivered. |
| NEXTI |

FIG. 1C

| |
|--|
| Please delete messages you no longer need. |
| OKI BACK |

FIG. 1D

| |
|--|
| Memory nearly full. Please delete msgs you no longer need. |
| OKI IGNORE |

FIG. 1E

| | |
|--------------------|---|
| 1. 817-976-4523 | S |
| 2. o Traffic | S |
| 3. Don't forget... | S |
| SELECTI u/d HOME | |
| U/D | |

FIG. 1F

| | |
|--------------------|---|
| 4. 716-883-2317 | S |
| 5. Boss | |
| 6. 503-664-6623 | S |
| SELECTI u/d HOME | |
| U/D | |

FIG. 1G

| |
|---------------------------------------|
| Memory full. Message cannot be SAVED. |
| OKI |

FIG. 1H

| |
|---------------------|
| >1. Voice mail (23) |
| 2. Text (T=10/o=3) |
| 3. Compose & Send |
| SELECTI u/d HOME |
| U/D |

FIG. 1I

| | |
|--|------|
| 7:30 AM | 10/5 |
| Accident on I-635 WB at Coit. Use alternate route t... | |
| DELETE U/D HOME | |
| SAVE | |

FIG. 1J

| | |
|-------------------|------|
| EMERGENCY message | |
| at 3:30 PM from | |
| Weather | |
| READ | HOME |

FIG. 1K

| | |
|--------------------|------------|
| 4. Saved text msgs | |
| 5. Setup | |
| 6. Cancel sent msg | |
| SELECT | u/d HOME |
| U/D | |

FIG. 1L

| | |
|--------------------|------------|
| 7. Prepared msgs | |
| 8. Last UNSENT msg | |
| SELECT | u/d HOME |
| U/D | |

FIG. 1M

| | |
|--------------------|------------|
| >1. o Weather | |
| 2. 817-976-4523 | |
| 3. o Traffic | |
| SELECT | u/d BACK |
| UNREADY U/D HOME | |

FIG. 1N

| | |
|---------------------|------------|
| 4. Tom Jones | |
| 5. Don't forget...S | |
| 6. 716-883-2317 | |
| SELECT | u/d BACK |
| UNREADY U/D HOME | |

FIG. 1O

| | |
|--------------------|------------|
| 7. Tina | |
| 8. Boss | |
| 9. o Sports | |
| SELECT | u/d BACK |
| UNREADY U/D HOME | |

FIG. 1P

| | |
|---------------------|------------|
| 10. 503-664-6623 | |
| 11. Your car ha...R | |
| 12. o CNN News | |
| SELECT | u/d BACK |
| UNREADY U/D HOME | |

FIG. 1Q

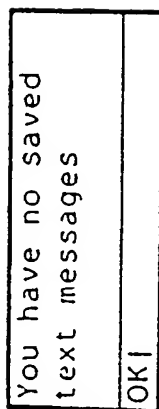
| | |
|---------------------|------------|
| >1. o Traffic | |
| 2. Don't forget...S | |
| 3. 716-883-2317 | |
| SELECT | u/d BACK |
| U/D HOME | |

FIG. 1R

| | |
|-----------------|------------|
| 4. 503-664-6623 | |
| S | |
| SELECT | u/d BACK |
| U/D HOME | |

3 / 10

FIG. 1S



4 / 10

FIG. 2

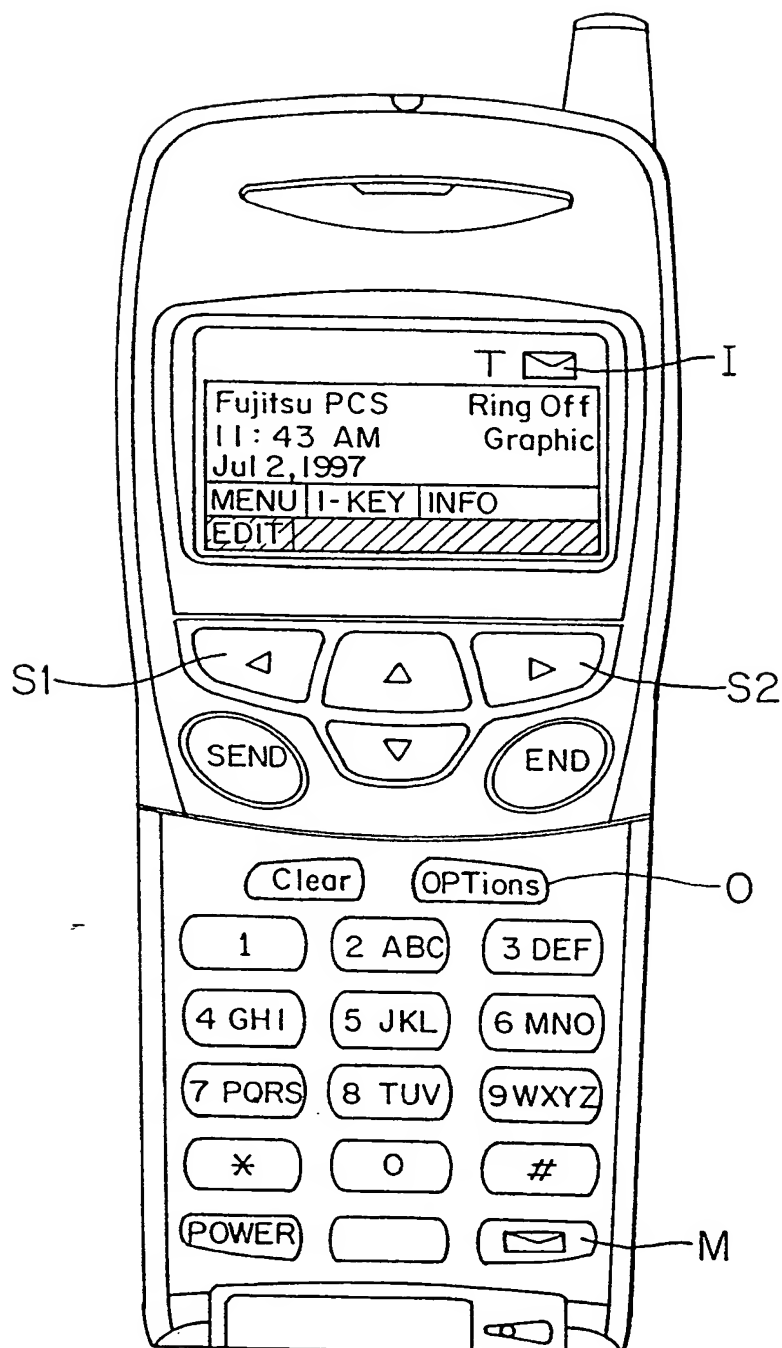


FIG. 3A

| |
|---------------------------|
| You have no text messages |
| OK |

FIG. 3B

| | |
|---|------|
| 10:30 AM | 1/13 |
| Heavy snow will begin in the DFW area sometime aft... | |
| NEXT MSG U/D BACK | |
| PREV MSG DELETE | |
| SAVE HOME | |

FIG. 3C

| |
|--------------------------------------|
| FROM: 817-976-4523 |
| 12:03 PM 10/01 |
| Text message may occupy all 4 lines. |
| NEXT MSG U/D BACK |
| REPLY DELETE SAVE |
| PREV MSG FWD HOME |
| CALL BK |

FIG. 3D

| |
|--------------------------------------|
| The call back number is 214-876-4534 |
| CALL CALL LD BACK |
| HOME |

FIG. 4A

| |
|-------------------|
| Enter phone # |
| - for -->;# for - |
| NEXTI CLEAR IBACK |
| GET#I SYMB IHOME |

FIG. 4B

| |
|--------------------------|
| TO: Tim White |
| SEND MSG I SPACE I BACK |
| A->a I CLEAR I SYMB |
| I I u/d I r |
| SET PROP I U/D I GET MSG |
| CANCEL I CLR MSG I HOME |

FIG. 4C

| |
|--------------------------|
| TO: 817-976-4523 |
| SEND RPY I SPACE I BACK |
| A->a I CLEAR I SYMB |
| I I u/d I r |
| SET PROP I U/D I GET MSG |
| CANCEL I CLR MSG I HOME |

FIG. 4D

| |
|--------------------------|
| FWD TO: 716-453-8921 |
| Enter msg (optional) |
| SEND FWD I SPACE I BACK |
| A->a I CLEAR I SYMB |
| I I u/d I r |
| SET PROP I U/D I GET MSG |
| CANCEL I CLR MSG I HOME |

FIG. 4E

| |
|-----------------------|
| TO: Jim Wright |
| I can meet with you |
| in your office on... |
| SEND MSG I U/D I BACK |
| SET PROP I U/D I HOME |

FIG. 4F

| |
|---------------------|
| >1. Prepared msg |
| 2. Saved text msg |
| 3. Last SENT msg |
| SELECT I u/d I BACK |
| I I HOME |

FIG. 4G

| |
|----------------------|
| >1. Staff meeting... |
| 2. Received your... |
| 3. Congratulations! |
| SELECT I u/d I BACK |
| I I U/D I HOME |

FIG. 4H

| |
|---------------------|
| 4. Will be home at |
| SELECT I u/d I BACK |
| I I U/D I HOME |

FIG. 4I

| |
|---------------------|
| 1. Don't forget...S |
| 2. 716-883-2317 S |
| 3. 503-664-6623 S |
| SELECT I u/d I BACK |
| I I U/D I HOME |

FIG. 4J

| |
|-------------------|
| Will be home at |
| COPY MSGIU/DIBACK |
| HOME |

FIG. 4K

| |
|----------------------|
| FROM: 716-883-2317 |
| 12:03 PM 10/01 |
| Text message may ... |
| COPY MSGIU/DIBACK |
| HOME |

FIG. 4L

| |
|---|
| This is the last message sent from this handset. It ... |
| COPY MSGIU/DIBACK |
| HOME |

FIG. 5A

| | |
|-------------------------------|------|
| You have no prepared messages | |
| ADD | BACK |
| HOME | |

FIG 5B

| | |
|---------------|--------------|
| Enter message | |
| - | |
| SAVE | SPACE BACK |
| A->a | CLEAR SYMB |
| | u/d |
| HOME | |

FIG. 5C

| | |
|----------------------|------------|
| >1. Staff meeting... | |
| 2. Received your... | |
| 3. Congratulations! | |
| SELECT | u/d BACK |
| ADD | u/d HOME |
| MOVE | |

FIG. 5D

| | |
|--------------------|------------|
| 4. Will be home at | |
| SELECT | u/d BACK |
| ADD | u/d HOME |
| MOVE | |

FIG. 5E

| | |
|-----------------|------------|
| Will be home at | |
| DELETE | u/d BACK |
| EDIT | HOME |

FIG. 5F

| | |
|---|--|
| You must delete one prepared msg before adding another. | |
| OK | |

FIG. 5G

| | |
|----------------------|----|
| Will be home at 9 PM | |
| SAVE changes? | |
| YES | NO |

FIG. 6A

| | |
|---|----|
| Cannot SEND message. Outside SMS SEND area. SAVE message? | |
| YES | NO |

FIG. 6B

| | |
|--|-----|
| Your message to 507-453-7756 has been SAVED. ... | |
| OK | U/D |

FIG. 6C

| | |
|--|-----|
| To SEND msg later, press Messages key and select choice 8. | |
| OK | U/D |

FIG. 6D

| | |
|---|------|
| TO: Jim Wright I can meet with you in your office on... | |
| SEND MSG | U/D |
| SET | PROB |

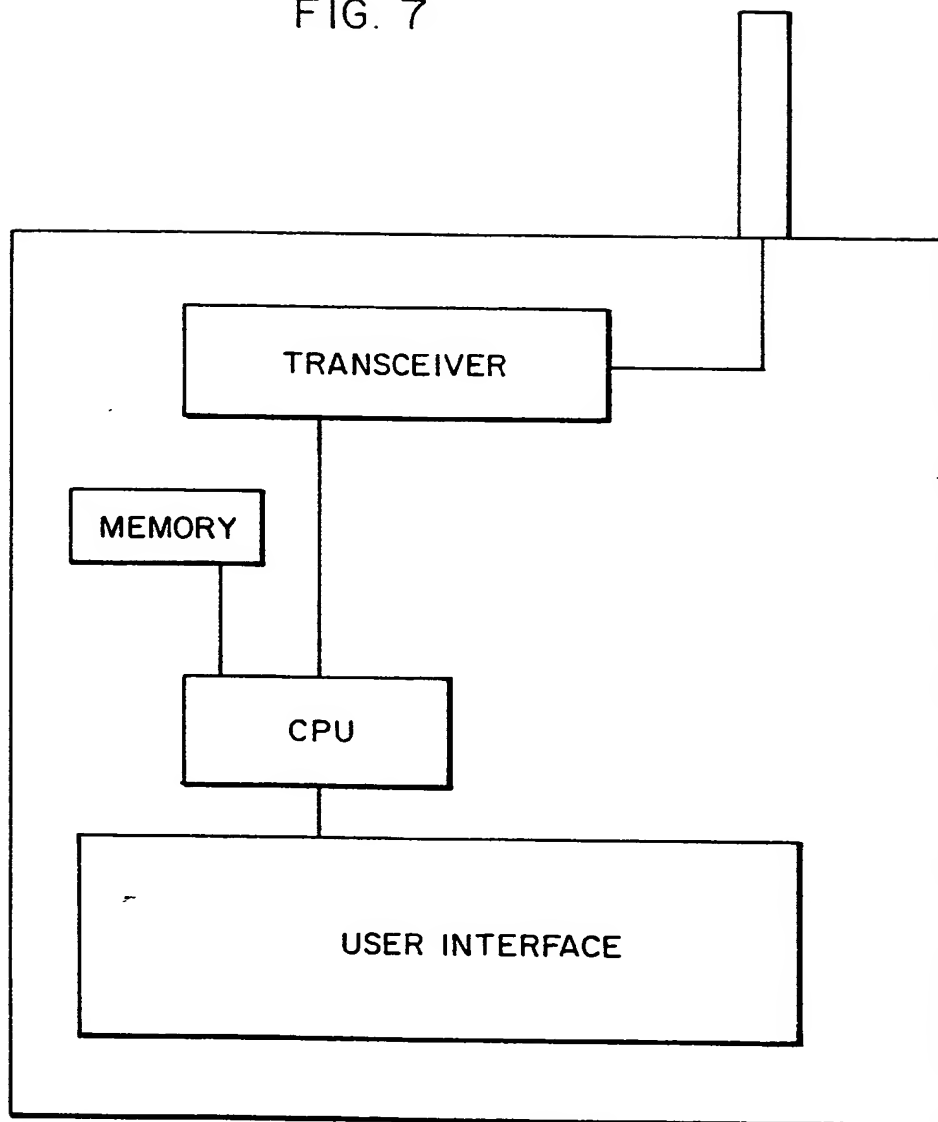
FIG. 6E

| | |
|----------------------------|--------|
| Message will be sent to | |
| OK | CANCEL |
| SEND | |

FIG. 6F

| | |
|-------------------------------|--|
| You have no UNSENT message | |
| OK | |

FIG. 7



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/03697

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : H04Q 7/20

US CL : 455/466

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 455/38.1, 1466, 186.1, 566, 575, 556; 340/825.44

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
noneElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
none

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
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| Y | US 5,751,793 A (DAVIES et al) 12 May 1998, col. 2, line 35 - col. 3, line 15 | 6-11 |
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Further documents are listed in the continuation of Box C.



See patent family annex.

| | |
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25 APRIL 1999

Date of mailing of the international search report

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